

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 30 SEP 1997		2. REPORT TYPE		3. DATES COVERED 00-00-1997 to 00-00-1997	
4. TITLE AND SUBTITLE Sedimentologic Events on the Eel River Shelf				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Humboldt State University, Department of Oceanography, Arcata, CA, 95521				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 2	19a. NAME OF RESPONSIBLE PERSON
a REPORT unclassified	b ABSTRACT unclassified	c THIS PAGE unclassified			

SEDIMENTOLOGIC EVENTS ON THE EEL RIVER SHELF

Jeffrey C. Borgeld
Department of Oceanography
Humboldt State University
Arcata, CA 95521
phone: (707)826-3328/fax:(707)826-4147
e-mail: jcb2@axe.humboldt.edu
Award#: N00014-95-1-0035

LONG-TERM GOALS

This project represents part of a coordinated effort to study processes influencing the emplacement and modification of strata on the Eel River continental shelf. The aim is to be able to recognize the layers produced by specific events in shelf strata deposited over time scales of years to millions of years and to understand the factors that account for the distribution of layers in space and time.

OBJECTIVES

This research addresses three main objectives: a) characterize event layers that formed during the course of this project and monitor their modification over time, b) investigate the nature of across-shelf variations in sediment boundaries that affect their acoustic representation, and c) compare short term records of sedimentation to a longer term history of sedimentation.

APPROACH

The primary sampling tools used were sediment box and Kasten cores. Core slabs were collected from each core. Slabs were x-radiographed and then subsampled for existing strata. Subsamples and x-radiographs were used to determine sediment size and texture. In addition, syringe samples were collected for the upper 12 cm to determine sediment porosity and bulk density. Sedimentologic parameters were compared to acoustic back scatter data collected in July of 1995.

WORK COMPLETED

Four research cruises were conducted during FY97: *F/V Warrior II* (cruise WR9611), *R/V Wecoma* (W9701), *R/V Pt. Sur* (PS9705) and *R/V Melville* (M9707). All sediment cores have been subsampled; sediment porosity and bulk densities have been determined.

RESULTS

An event bed was deposited on the continental shelf associated with the 1995 flood of the Eel River (Wheatcroft *et al.* 1996, 1997). The sediments were deposited primarily to the north of the river mouth. These newly deposited sediments were recognized in sediment cores collected immediately following the event; these strata can be recognized to the present day. The base of the 1995 deposit is characterized by a clayey silt layer overlain by a rippled coarse silt overlain by another clayey silt layer. These strata comprise a time horizon that can be used to evaluate post-depositional modification that has occurred following the event. The surface of the shelf has undergone modification that includes bioturbation of the surface sediments and the removal of the 1995 layer in water depths shallower than about 50 meters. The base of the 1995 deposit has experienced some bioturbation but has maintained its integrity.

Acoustic swath mapping conducted in the summer of 1995 revealed regional variations in acoustic back scatter that could be related to the sedimentology. The highest acoustic back scatter was identified in

association with fine silts with high water contents where the 1995 sediments remained intact and near the sediment surface. Low acoustic back scatter was associated with the fine sands and coarse silts in the nearshore sand facies and subaqueous deltas of the Eel and Mad Rivers.

In 1996, a thinner bed was deposited associated with smaller-scale flooding. In contrast to the 1995 event, some of these riverine sediments were deposited south of the river mouth, presumably by more southerly directed shelf currents. These sediments appear to have been mixed and remobilized since their initial deposition. In 1997, another flood event occurred that was even larger than the 1995 event. Sediments associated with the event were broadcast in a more shelf-wide deposit with silty clays deposited both north and south of the river mouth, with little variation in grain size in the deposits sampled on the shelf.

IMPACT/APPLICATION

Differences in the 1995, 1996 and 1997 flood deposits of the Eel River provide some insight into processes that have produced strata in a shelf setting and the potential for longer term preservation of such strata. In addition, the apparent match between increased acoustic back scatter and deposition of the 1995 flood deposit of the river is an intriguing result that deserves more attention.

TRANSITIONS

The sediment textural data being generated are being utilized by a number of other investigators within the Strataform program.

RELATED PROJECTS

Research into shelf processes is being conducted by a number of researchers, including: D. Drake (USGS), E. Leithold (NCSU), C. Nittrouer (SUNY), D. Swift (ODU) and R. Wheatcroft (WHOI).

REFERENCES

Wheatcroft, R.A., Borgeld, J.C., Born, R.S., Drake, D.E., Leithold, E.L. and Nittrouer, C.A., 1996, The anatomy of an oceanic flood deposit, *Oceanography*, 9, 158-162.

Wheatcroft, R.A., Sommerfield, C.K., Drake, D.E., Borgeld, J.C. and Nittrouer, C.A. 1997. Rapid and widespread dispersal of flood sediment on the northern California margin. *Geology*, v. 25, p. 163-166.